

**ENGINEERING EVALUATION  
City of Pinole Fire Department; PLANT 15458  
APPLICATION 7691**

**BACKGROUND**

City of Pinole Fire Department has applied for a diesel engine (S-1), which will be used to power a standby generator.

**EMISSIONS**

**Annual Average Emissions:**

Basis:        - 75.1 bhp output rating for full-load, standby operation  
              - 9 hr/yr operation for testing and maintenance  
              - NO<sub>x</sub>, VOC, CO and PM<sub>10</sub> emission factors from CARB certification data (Executive Order U-R-022-0043):

NO<sub>x</sub>:            6.41 g/hp-hr  
VOC:            0.30 g/hp-hr (assume all POC compounds)  
CO:             1.19 g/hp-hr  
PM<sub>10</sub>:          0.57 g/hp-hr

SO<sub>2</sub> emission factor is from EPA AP-42, Table 3.4-1 ("Large Stationary Diesel and Dual-Fuel Engines"), which is based on full conversion of fuel sulfur to SO<sub>2</sub> and which will therefore be considered applicable to any diesel engine (sulfur content will be assumed to be the California limit of 0.05 wt% sulfur):

SO<sub>2</sub>:            8.09E-3(0.05) lb/hp-hr (454 g/lb) = 0.18 g/hp-hr

**NO<sub>x</sub>:** (9 hr/yr)(75.1 hp)(6.41 g/hp-hr)(lb/454 g)/(365 day/yr) = **0.026 lb/day**

**POC:** (9 hr/yr)(75.1 hp)(0.30 g/hp-hr)(lb/454 g)/(365 day/yr) = **0.001 lb/day**

**CO:** (9 hr/yr)(75.1 hp)(1.19 g/hp-hr)(lb/454 g)/(365 day/yr) = **0.005 lb/day**

**PM<sub>10</sub>:** (9 hr/yr)(75.1 hp)(0.57 g/hp-hr)(lb/454 g)/(365 day/yr) = **0.0023 lb/day**  
**Or 0.85 lb/yr**

**SO<sub>2</sub>:** (9 hr/yr)(75.1 hp)(0.18 g/hp-hr)(lb/454 g)/(365 day/yr) = **0.001 lb/day**

**Note:** Results from the health risk screening analysis indicate that the maximum cancer risk is estimated at 3.7 in a million for requested 34 hr/year operation of this engine for reliability-related activities. In accordance with the District's Risk Management Policy, this risk level is considered acceptable if the engine meets current TBACT requirements. However, since this engine does not meet current TBACT requirements of 0.15 g/hp-hr for PM<sub>10</sub> emissions, this risk level is not considered acceptable. Applicant was given the following options to bring the risk down to an acceptable level:

- Limiting the hours of operation to no more than 9 hours per year; or
- Installing an abatement device that meets current TBACT requirements and can reduce diesel exhaust particulate emissions.

The application contact, Mr. Bill Mattick, agreed to 9 hr/yr engine operation for reliability-related activities.

**Daily Emissions:**

Daily emissions are calculated to establish whether a source triggers the requirement for BACT (10 lb/highest day total source emissions for any class of pollutants). 24-hr/day operation will be assumed.

$$\text{NOx: } (24 \text{ hr/day})(75.1 \text{ hp})(6.41 \text{ g/hp-hr})(\text{lb}/454 \text{ g}) = \mathbf{25.45 \text{ lb/day}}$$

$$\text{POC: } (24 \text{ hr/day})(75.1 \text{ hp})(0.30 \text{ g/hp-hr})(\text{lb}/454 \text{ g}) = \mathbf{1.19 \text{ lb/day}}$$

$$\text{CO: } (24 \text{ hr/day})(75.1 \text{ hp})(1.19 \text{ g/hp-hr})(\text{lb}/454 \text{ g}) = \mathbf{4.72 \text{ lb/day}}$$

$$\text{PM}_{10}: (24 \text{ hr/day})(75.1 \text{ hp})(0.57 \text{ g/hp-hr})(\text{lb}/454 \text{ g}) = \mathbf{2.26 \text{ lb/day}}$$

$$\text{SO}_2: (24 \text{ hr/day})(75.1 \text{ hp})(0.18 \text{ g/hp-hr})(\text{lb}/454 \text{ g}) = \mathbf{0.71 \text{ lb/day}}$$

**PLANT CUMULATIVE INCREASE**

|                         | <b>current</b><br><b>(ton/yr)</b> | <b>proposed</b><br><b>(lb/day)</b> | <b>(ton/yr)</b>   | <b>new total</b><br><b>(ton/yr)</b> |
|-------------------------|-----------------------------------|------------------------------------|-------------------|-------------------------------------|
| <b>POC:</b>             | 0                                 | <b>0.001</b>                       | <b>negligible</b> | <b>negligible</b>                   |
| <b>NOx:</b>             | 0                                 | <b>0.026</b>                       | <b>0.005</b>      | <b>0.005</b>                        |
| <b>SO<sub>2</sub>:</b>  | 0                                 | <b>0.001</b>                       | <b>negligible</b> | <b>negligible</b>                   |
| <b>CO:</b>              | 0                                 | <b>0.005</b>                       | <b>0.001</b>      | <b>0.001</b>                        |
| <b>NPOC:</b>            | 0                                 | 0                                  | 0                 | 0                                   |
| <b>PM<sub>10</sub>:</b> | 0                                 | <b>0.0023</b>                      | <b>negligible</b> | <b>negligible</b>                   |

**TOXIC RISK SCREENING ANALYSIS**

The cancer risk is calculated based on the emission rate of diesel exhaust particulate matter. Diesel exhaust particulate matter is used as a surrogate for all toxic contaminants found in diesel exhaust. Because the proposed emissions (0.85 lb/yr for 9 hours) exceed the risk screening trigger level for diesel exhaust particulate matter in Table 2-1-316 (0.64 lb/yr), a risk screening was performed.

Per the attached 8/21/03 memo from Daphne Chong, District Toxicologist, the proposed operation of the diesel engine would result in an increased maximum cancer risk of 0.97 chances in a million, and a hazard index of 0.0006 for residences near the facility. For students who attend Ellerhorst Elementary School, the increased maximum cancer risk is 0.11 chances in a million, and the hazard index is 0.0004. These health risk values mentioned above meet the criteria for acceptable levels established in the BAAQMD's Risk Management Policy.

These potential cancer risks were calculated using standard risk assessment methodology. For residents, it was assumed that exposure would be continuous for 24 hours per day, 7 days per week for 70-years. For students, exposure was assumed to occur 36 weeks per year over a 9-year period. Students were also assumed to have a higher breathing rate than residents. The cancer risks are based in part on the "best estimates" of plausible cancer potencies as determined by the California Office of Environmental Health Hazard Assessment (OEHHA). The actual cancer risk, which cannot be determined, may approach zero. This type of analysis is considered to be

health-protective. Ambient air concentrations of diesel exhaust particulate were predicted using the ISCST3 air dispersion computer model.

**BACT**

BACT is triggered for NO<sub>x</sub> as maximum daily emissions exceed 10 lb/day, as calculated on page 2 (Daily Emissions). S-1 satisfies the current BACT 2 standard of 6.9 g/hp-hr for NO<sub>x</sub>. The more restrictive BACT 1 standard is not applicable to this engine because it will be limited to operation as a standby engine.

Since CARB certification data was used to establish the NO<sub>x</sub> emission factor, the BACT 2 emission limit has not been incorporated into the permit conditions and is assumed to be complied with through the design standards demonstrated by the CARB certification testing.

**OFFSETS**

Offsets are not required because permitted POC and NO<sub>x</sub> emissions are each expected to be less than 15 ton/yr.

**STATEMENT OF COMPLIANCE**

S-1 will be operated as an emergency standby engine and therefore is not subject to the emission rate limits in Regulation 9, Rule 8 ("NO<sub>x</sub> and CO from Stationary Internal Combustion Engines"). S-1 is subject to the monitoring and record keeping requirements of Regulation 9-8-530 and the SO<sub>2</sub> limitations of 9-1-301 (ground-level concentration) and 9-1-304 (0.5% by weight in fuel). Regulation 9-8-530 requirements are incorporated into the proposed permit conditions. Compliance with Regulation 9-1 is very likely since diesel fuel with a 0.05% by weight sulfur is mandated for use in California. Like all sources, the S-1 is subject to Regulation 6 ("Particulate and Visible Emissions"). This engine is not expected to produce visible emissions or fallout in violation of this regulation and will be assumed to be in compliance with Regulation 6 pending a regular inspection.

This application is considered to be ministerial under the District's Regulation 2-1-311 and therefore is not subject to CEQA review. The engineering review for this project requires only the application of standard permit conditions and standard emission factors in accordance with Permit Handbook Chapter 2.3.

PSD, NSPS and NESHAPS are not triggered.

**PUBLIC NOTIFICATION**

Source S-1 is located within 1,000 feet of the nearest public school (Ellerhorst Elementary School) and hence this project is subject to the public notification requirements contained in Regulation 2-1-412. These requirements apply to the parents of the students at Ellerhorst Elementary School, the parents of the students at any other school within 1/4 mile of the source, and all other addresses within 1,000 feet of the source.

**PERMIT CONDITIONS**

APPLICATION 7691; City of Pinole Fire Department; PLANT 15458  
CONDITIONS FOR S-1

1. The owner/operator of emergency generator S-1 shall use only diesel fuel having sulfur content less than 0.05% by weight. The sulfur content of the fuel oil shall be certified by the fuel oil vendor.  
[Basis: Cumulative Increase]
2. The owner/operator of S-1 shall only operate this engine to mitigate emergency conditions or for reliability-related activities. Operation for reliability-related activities shall not exceed 34 hours in any calendar year. Operation while mitigating emergency conditions is unlimited.  
[Basis: Regulation 9-8-330, Cumulative Increase]

“Emergency Conditions” is defined as any of the following:

[Basis: Regulation 9-8-231]

- a. Loss of regular natural gas supply
- b. Failure of regular electric power supply
- c. Flood mitigation
- d. Sewage overflow mitigation
- e. Fire
- f. Failure of a primary motor, but only for such time as needed to repair or replace the primary motor

“Reliability-related activities” is defined as any of the following: [Basis: Regulation 9-8-232]

- a. Operation of an emergency standby engine to test its ability to perform for an emergency use, or
  - b. Operation of an emergency standby engine during maintenance of a primary motor
3. The owner/operator of S-1 shall provide this engine with either: [Basis: Regulation 9-8-530]
    - a. a non-resettable totalizing meter that measures the hours of operation for the engine, OR
    - b. a non-resettable fuel usage meter (2.4 gallons of fuel shall be assumed to be equivalent to 1 hour of reliability-related operation)
  4. The owner/operator of S-1 shall maintain the following monthly records. These records shall be kept in a District-approved log for at least 2 years and shall be made available for District inspection upon request:  
[Basis: Regulations 9-8-530, 1-441]
    - a. Total hours of operation
    - b. Hours of operation under emergency conditions and a description of the nature of each emergency condition
    - c. Fuel usage

**RECOMMENDATION**

Waive Authority to Construct and issue a Permit to Operate to City of Pinole Fire Department for:

**S-1                    Emergency Standby Generator: Diesel Engine, Perkins, 75.1HP**

By: \_\_\_\_\_  
                  **Sanjeev Kamboj**  
                  **Air Quality Engineer**